REMARKS

Claims 1, 3, 8-20, 22-25 and 29 are pending in the application. Claims 2, 4-7, 21 and 26-28 were canceled. Claim 1 was amended to more particularly point out and distinctly claim the present invention by incorporating the limitations of claims 2 and 5 therein. Claim 3 was amended to further define the present invention. Claims 10, 14-19, 23-25 and 29 were amended to change their dependencies from canceled claims 5 and 21 to claims 1 and 22. For at least the reasons set forth below, withdrawal of all outstanding rejections is respectfully requested.

35 U.S.C. § 112, second paragraph, rejection

Claim 7 was canceled. Accordingly, this rejection is moot.

Drawing Objection

Figs. 15 and 16 have been amended to address the Drawing Objections.

Prior Art Rejections

Claims 1, 2, 9, 20, 26 and 28 were rejected under 35 U.S.C. § 102(b) as being anticipated by Shinkai.

Claims 1, 2, 9, 20, 26 and 28 were rejected under 35 U.S.C. § 102(b) as being anticipated by Takeuchi et al., hereafter "Takeuchi".

Claims 1-4, 13, 26 and 27 were rejected under 35 U.S.C. § 102(b) as being anticipated byYanagawa.

Claims 5-7, 21, 23 and 29 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Shinkai in view of Hiroki et al., hereafter "Hiroki".

Claims 11 and 12 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Takeuchi in view of U.S. Patent No. 5,526,329 (Bish).

Claim 22 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Yanagawa in view of Hiroki.

Claims 1-2, 6, 8, 9, 21, 23-26 and 28-29 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Kusumoto et al., hereafter "Kusumoto," in view of Takeuchi.

Claims 5, 10 and 14-19 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Kusumoto in view of Takeuchi and Yanagawa.

1. Patentability of independent claim 1 over Shinkai in view of Hiroki

Claim 1, as amended, recites, *inter alia* (underlining added for emphasis):

> a tracking error amplitude adjusting section for multiplying the tracking error signal by a predetermined proportionality constant, and
>
> a tracking gain calculating section for calculating and storing a gain of a tracking control loop, which is defined by the tracking error detecting section, the tracking error amplitude adjusting section and the tracking control section, at an arbitrary frequency,
>
> wherein the gain of the tracking error signal is switched by changing the proportionality constant depending on whether or not the focal point of the light beam is located on the recorded area, and
>
> wherein a ratio of the gain that has been calculated by the tracking gain calculating section for the recorded area, on which the data has been written, to the gain that has been calculated by the tracking gain calculating section for an unrecorded area, on which the data has not yet been written, is used as the proportionality constant

a. Hiroki does not disclose or suggest the tracking gain calculating section

Amended claim 1 recites multiplying the tracking error signal by a predetermined proportionality constant, wherein a ratio of the gain that has been calculated by the tracking gain calculating section for the recorded area, on which the data has been written, to the gain that has been calculated by the tracking gain calculating section for an unrecorded area, on which the data has not yet been written, is used as the proportionality constant. This limitation is not disclosed or suggested in Shinkai or Hiroki.

The tracking gain calculating section of the present invention calculates a gain of a tracking control loop, which is defined by the tracking error detecting section, the tracking error amplitude adjusting section and the tracking control section. The tracking gain calculating section of the present invention stores the calculated gains for both a recorded and an unrecorded area and then calculates a ratio of these two gains which is outputted to the tracking error amplitude adjusting section. See paragraphs [0082] and [0083] beginning on page 29, line 14 of

the specification. The tracking error amplitude adjusting section then uses the calculated ratio as a predetermined proportionality constant by which to multiply the tracking error signal.

The Examiner acknowledges that Shinkai does not disclose the tracking gain calculating section of the present invention. However, the Examiner states that Fig. 9 and column 9, line 20 through column 10, line 40 of Hiroki discloses a tracking gain calculating section for calculating and storing a gain of a tracking control loop, which is defined by the gain of the tracking error detecting section, the tracking error amplitude adjusting section and the tracking control section at an arbitrary frequency.

Hiroki discloses in column 3, lines 47-55 that a conventional automatic gain control circuit (AGC) cannot adjust an offset change due to temperature characteristics or aging of an element. The AGC disclosed in column 9, line 21 through column 10, line 39 of Hiroki solves that problem by adjusting such offsets by measuring two signal amplitude values A1 and A2 and calculating the gain (A1/A2) as the ratio of the two amplitude values.

However, Hiroki does not disclose calculating a ratio of two gains for any reason. Thus, Hiroki does not disclose using the ratio of a gain for a recorded area to the gain for an unrecorded area as a proportionality constant to adjust a tracking error signal. For this reason, Hiroki does not disclose or suggest the invention recited in claim 1.

b. Shinkai does not disclose or suggest the tracking error amplitude adjusting section

Additionally, neither Shinkai or Hiroki discloses a tracking error amplitude adjusting section for multiplying the tracking error signal by a predetermined proportionality constant, where the gain of the tracking error signal is switched by changing the proportionality constant, as recited in amended claim 1. The Examiner states that Fig. 5, item 30 and column 8, line 35 through column 9, line 2 of Shinkai discloses a tracking error amplitude adjusting section for multiplying the tracking error signal by a predetermined proportionality constant, wherein the gain of the tracking error signal is switched by changing the proportionality constant depending on whether or not the focal point of the light beam is located on the recorded area. Column 8, line 35 through column 9, line 2 of Shinkai read as follows (underlining added for emphasis):

> The signal Qb is supplied to the OR gate circuit 33 and a signal Qc taking the high level h in synchronism with the portion Lh of the signal Qb

and the low level l in synchronism with the portion Ll of the signal Qb, as shown in FIG. 6D, is obtained from the OR gate circuit 33 to be supplied to the control terminal of the gain control circuit 30. With this signal Qc from the OR gate circuit 33, the gain control circuit 30 is caused to control the gain for transmission of the modified tracking error signal TE' to be increased during the period in which the signal Qc takes the high level h. When the signal Qc takes the high level h, the laser light beam reflected at the recorded area in the recording portion 3 on the disc D is received by the photodetecting device 15 and therefore the amplitude of the modified tracking error signal TE' is modified to be decreased before being supplied to the gain control circuit 30. Accordingly, with the gain for transmission of the modified tracking error signal TE' increased in the gain control circuit 30, an appropriate loop gain for tracking servocontrol can be set in the arrangement shown in FIG. 5.

During the period in which the signal Qc takes the low level l, the gain control circuit 30 is caused to control the gain for transmission of the modified tracking error signal TE' to be decreased with the signal Qc from the OR gate circuit 33. When the signal Qc takes the low level l, the laser light beam reflected at the blank area in the recording portion 3 on the disc D is received by the photodetecting device 15 and therefore the amplitude of the modified tracking error signal TE' is modified to be increased before being supplied to the gain control circuit 30. Accordingly, with the gain for transmission of the modified tracking error signal TE' decreased in the gain control circuit 30, the appropriate loop gain for tracking servocontrol can be also set in the arrangement shown in FIG. 5.

The cited passage in Shinkai simply discloses increasing or decreasing the amplitude of the modified tracking error signal TE' before it is supplied to a gain control circuit 30. Nowhere does Shinkai disclose switching the value of the gain in the gain control circuit 30. For this additional reason, Shinkai does not disclose or suggest the invention recited in claim 1. Hiroki does not make up for this deficiency in Shinkai.

Accordingly, claim 1 is believed to be patentable over the applied references.

2. Patentability of independent claim 1 over Kusumoto in view of Takeuchi and Yanagawa

Claim 1, as amended, recites, *inter alia* (underlining added for emphasis):

a tracking error amplitude adjusting section for multiplying the tracking error signal by a predetermined proportionality constant, and

a tracking gain calculating section for calculating and storing a gain of a tracking control loop, which is defined by the tracking error

> detecting section, the tracking error amplitude adjusting section and the tracking control section, at an arbitrary frequency,
>
> wherein the gain of the tracking error signal is switched by changing the proportionality constant depending on whether or not the focal point of the light beam is located on the recorded area, and
>
> wherein a ratio of the gain that has been calculated by the tracking gain calculating section for the recorded area, on which the data has been written, to the gain that has been calculated by the tracking gain calculating section for an unrecorded area, on which the data has not yet been written, is used as the proportionality constant

Amended claim 1 recites multiplying the tracking error signal by a predetermined proportionality constant, wherein a ratio of the gain that has been calculated by the tracking gain calculating section for the recorded area, on which the data has been written, to the gain that has been calculated by the tracking gain calculating section for an unrecorded area, on which the data has not yet been written, is used as the proportionality constant. This limitation is not disclosed or suggested in Kusumoto, Takeuchi or Yanagawa.

The Examiner acknowledges that Kusumoto in view of Takeuchi does not disclose wherein a ratio of the gain that has been calculated by the tracking gain calculating section for the recorded area, on which the data has been written, to the gain that has been calculated by the tracking gain calculating section for an unrecorded area, on which the data has not yet been written, is used as the proportionality constant. The Examiner states that Fig. 1 and column 4, lines 35-55 of Yanagawa discloses wherein a ratio of the gain that has been calculated by the tracking gain calculating section for the recorded area, on which the data has been written, to the gain that has been calculated by the tracking gain calculating section for an unrecorded area, on which the data has not yet been written, is used as the proportionality constant. Additionally, the Examiner states that Yanagawa shows that you could have a base gain and use a ratio to get a second gain. However, Yanagawa does not disclose anything whatsoever regarding a recorded area and an unrecorded area, does not disclose any type of predetermined proportionality constant and does not disclose using a ratio and a base gain to get a second gain. Column 4, lines 35-55 of Yanagawa read as follows (underlining added for emphasis):

> The comparator 24 compares the amplitude of the reading tracking error signal with the amplitude of the intentional recording tracking error signal stored in the memory 30. When the two values differ from each other, the microcomputer 29 determines a desired gain of the amplifier 26,

> until the amplitude of the reading tracking error stored in memory 22 coincides with the level of the recording error stored in memory 30. Namely the resistance of the variable resistor 27 is set at a value corresponding to the determined gain by the microcomputer 29 (step 504). The resistor 27 is controlled until it is determined at a step 505 that the amplitude of the reading tracking signal becomes equal to the amplitude of the recording tracking error signal.
>
> During reproduction, the movable contact 31c of the switch 31 is engaged with the fixed contact 31a. The track-following servo system is accordingly properly operated based on the corrected reading tracking error signal.

Yanagawa discloses only that a microcomputer 29 determines a desired gain of the amplifier 26, until the amplitude of the reading tracking error stored in memory 22 coincides with the level of the recording error stored in memory 30. This is not the same as using a ratio and a base gain to get a second gain or using any type of proportionality constant. Also, this has nothing to do with a relationship between a recorded and an unrecorded area. For these reasons, Yanagawa does not make up for the deficiencies of Kusumoto and Takeuchi. Thus, Kusumoto in view of Takeuchi and Yanagawa does not disclose or suggest the invention recited in claim 1.

Accordingly, claim 1 is believed to be patentable over the applied references.

3. Patentability of independent claim 22 over Yanagawa in view of Hiroki

Claim 22 recites (underlining added for emphasis):

> A tracking control method for controlling a light beam such that the focal point of the light beam is located right on a target track on a storage medium by detecting how much the focal point has shifted from the target track, the method comprising the steps of:
>
> calculating a first gain of a tracking control loop at an arbitrary frequency when the focal point of the light beam is located on a recorded area of the storage medium on which data has already been written;
>
> calculating a second gain of the tracking control loop at the arbitrary frequency when the focal point of the light beam is located on an unrecorded area of the storage medium on which no data has been written yet; and
>
> adjusting the gain of the tracking control loop according to the first and second gains by determining whether or not data is being written on the storage medium.

These limitations are not disclosed or suggested in Yanagawa or Hiroki.

The Examiner states that column 4, lines 20-35 of Yanagawa discloses calculating the first and second gains of the tracking control loop when the focal point of the light beam is located on a recorded area and an unrecorded area, respectively, of a storage medium and that column 4, lines 35-55 discloses adjusting the gain of the tracking control loop according to whether or not data is being written on the storage medium. However, as discussed above, no portion of Yanagawa discloses anything whatsoever regarding whether an area of a storage medium is recorded or unrecorded. For this reason, Yanagawa does not disclose or suggest the invention recited in claim 22. Hiroki does not make up for this deficiency in Yanagawa.

Accordingly, claim 22 is believed to be patentable over the applied references.

4. Patentability of the dependent claims

The dependent claims are believed to be patentable over the applied references for at least the reason that they are dependent upon allowable base claims and because they recite additional patentable elements and steps.

Conclusion

Insofar as the Examiner's rejections were fully addressed, the present application is in condition for allowance. Issuance of a Notice of Allowability of all pending claims is therefore requested.

Respectfully submitted,

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